Residues of PCDD, PCDF, NO-CB, and MO-CB in Ringed Seals (*Phoca hispida*) From Holman, NWT, in 1981, 1991, and 1996

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2000

Canadian Data Report of Fisheries and Aquatic Sciences 1070

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101-02633/

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Fisheries and Aquatic Sciences 1070

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RESIDUES OF PCDD, PCDF, NO-CB, AND MO-CB IN RINGED SEALS (*PHOCA HISPIDA*) FROM HOLMAN, NWT, in 1981, 1991, and 1996

by

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Cat. No. Fs 97-13/1070E ISSN 0706-6465

Correct citation for this publication:

Addison, R.F., Ikonomou, M.G., and Smith, T.G. 2000. Residues of PCDD, PCDF, NO-CB, and MO-CB in ringed seals (*Phoca hispida*) from Holman, NWT, in 1981, 1991, and 1996. Can. Data Rep. Fish. Aquat. Sci. 1070: iii + 43 pp.

ABSTRACT

Addison R.F., Ikonomou M.G., and Smith, T.G. 2000. Residues of PCDD, PCDF, NO-CB and MO-CB in ringed seals (*Phoca hispida*) from Holman, NWT, in 1981, 1991, and 1996. Can. Data Rep. Fish. Aquat. Sci. 1070: iii + 43 pp.

Ringed seal (*Phoca hispida*) were sampled during subsistence hunts at Holman, NWT, in spring of 1981, 1991 and 1996. Blubber samples were analysed for residues of polychlorinated dibenzo-*p*-dioxins (PCDD), polychlorinated dibenzofurans (PCDF) and for non-*ortho*- and mono-*ortho*-substituted chlorobiphenyls (NO-CB and MO-CB). This report summarises the analytical data.

RÉSUMÉ

Addison R.F., Ikonomou, M.G., and Smith, T.G. 2000. Residues of PCDD, PCDF, NO-CB and MO-CB in ringed seals (*Phoca hispida*) from Holman, NWT, in 1981, 1991, and 1996. Can. Data Rep. Fish. Aquat. Sci. 1070: iii + 43 pp.

Les phoques annelés (*Phoca hispida*) font l'objet d'un échantillonage dans les prises d'une chasse de subsistence à Holman (Territoires du Nord-Ouest) les printemps de 1981, 1991, et 1996. Le pannicule adipeux était analysé pour des residus des dibenzo-*p*-dioxines polychlorinés (PCDD), des dibenzofuranes polychlorinés (PCDF) et des chlorobiphenyles à substituants non *ortho* et mono *ortho*. Le présent rapport résume les données analytiques.

INTRODUCTION

Ringed seals (*Phoca hispida*) are harvested during subsistence hunts by the residents of Holman, NWT. Samples have been taken from this hunt since the early 1970's for analyses of organochlorine (OC) compounds (Addison and Smith 1974; Addison et al. 1986; Addison 1997; and Addison and Smith 1998). These studies have illustrated trends in OC contamination, particularly by the DDT group of insecticides and the polychlorinated biphenyls (PCBs), and more recently by some other OCs, in the western Arctic.

In this report we describe concentrations of polychlorinated dibenzo-*p*-dioxins (PCDD) and dibenzofurans (PCDF) in blubber from ringed seals sampled at Holman in 1981, 1991, and 1996. In addition, we report concentrations of non-*ortho*- and mono-*ortho*-substituted chlorobiphenyls (NO-CB and MO-CB, respectively) since some of these compounds have biological effects similar to those of the PCDD/F. Since trends in PCB concentrations between 1972 and 1991 in the Holman ringed seals have already been described (Addison and Smith 1998), the 1996 samples described here represent an additional point on a trend curve.

MATERIALS AND METHODS

Samples of blubber (10–50 g) were taken from the mid-dorsal region of ringed seals captured during subsistence hunts at Holman, NWT (70° 44'N, 117° 43'W) usually in May of 1981, 1991, and 1996. Length, girth, and sternal blubber thickness were measured. Sex and reproductive status were recorded. A canine tooth was removed for age determination (Laws 1962).

For this study, a sub-set of nine male blubber samples from each of the 1981, 1991, and 1996 collections were taken to cover a similar age range. An additional nine female samples, also of the same age range, were taken from the 1996 samples. Tissue samples were extracted and "cleaned up" following procedures described previously (Anon. 1992a, b; MacDonald et al. 1997). Lipid content was determined gravimetrically on aliquots of the extracts. Concentrations of PCDD/F and of NO- and MO-PCB were determined by high resolution gas chromatography/high resolution mass spectrometry (HRGC/HRMS) in the Institute of Ocean Sciences Regional Dioxin Laboratory (RDL).

Analytical data were summarised in Excel spreadsheets and analysed using software from Statistica. The data were also deposited in Fisheries and Oceans Canada's National Contaminants Information System (NCIS).

RESULTS

The data presented here include basic sampling and biological data (Table 1) followed by contaminant data (Tables.2 - 5) sorted by sample group and compound type. Data are presented as concentrations per unit wet weight, with percent lipid content of the tissue, so that concentrations per unit lipid can be calculated. Tables 6-10 summarise statistical analyses of the data. Table 11 shows toxic equivalents to 2,3,7,8-TCDD (TEQ) calculated from the data in Tables 2-5.

Samples were chosen to cover similar age ranges to eliminate potentially confounding effects of age on contaminant concentration in male animals. Ages did not differ significantly ($P > 0.05$ by t-test) between the four groups examined (1981, 1991, and 1996 males, and 1996 females). Blubber depth was significantly greater in the 1981 samples than in 1991, due to the 1981 samples being in better condition (Addison et al. 1986; Addison and Smith 1998). Lipid content in the 1991 samples was slightly (but significantly) lower than in 1981 or 1996 males.

PCDD/F concentrations were low, and often close to method detection limits or procedural blank values (data have not been corrected for blank values). Total PCDD concentrations in 1981 samples were higher than those from 1991 or 1996, but this difference was due to one anomalously high OCDD value (sample PHH 81-29, 29.3 pg/g wet wt.). When this was removed, mean OCDD and PCDD concentrations did not differ significantly among the three groups of male animals, and PCDD concentrations in 1996 females did not differ from those in 1996 males (Table 7). The main congeners present were usually 2,3,7,8-TCDD, 1,2,3,6,7,8-HxCDD and OCDD. There was no obvious trend in the relative proportions of the PCDD congeners between 1981 and 1996 nor between male and female samples in 1996 (Fig. 1).

PCDF concentrations were also low (below 5 pg/g wet wt.) and were dominated by 2,3,7,8-TCDF. There were no differences between concentrations in male samples between 1981 and 1996 (Fig. 2), nor between males and females in 1996 (Table 8).

Total NO-CB concentrations in male samples appeared to decline between 1991 and 1996, but this was due largely to an apparent dramatic reduction in the concentrations reported for CB 127 (Tables 4 and 9). It is not clear whether this decline is real or is an artifact of analytical error. Sample 96-39 contained anomalously high concentrations of mostly NO-CB, presumably from contamination at some point during the analysis; these data were omitted from statistical analyses. There were then no differences between NO-CB concentrations in male and female samples taken in 1996.

Samples from 1981 and 1991 had previously been analysed by Axys Laboratories for major CB congeners. Figure 3 shows a regression of analyses by RDL on analyses by Axys of six congeners (CB 56/60, 105, 114, 118, 156, and 157) in 1981 and 1991 male blubber samples. Although there were some small systematic errors (notably CB 105 being over-estimated and CB 114 under-estimated by RDL relative to Axys), the overall agreement between the two laboratories was excellent.

Of the MO-CB, lower congeners (di- and tri-chloro-substituted congeners) were not analysed in the 1981 and 1991 data sets as standards and methods were not available. Comparisons have therefore been made (Table 10) between the summed tetra- to hepta-chlorobiphenyls. These did not decline significantly in male samples between 1981 and 1996. However, female samples in 1996 had about half the concentrations of corresponding male samples. Within the tetra- to hepta-chlorobiphenyl groups, there were some small fluctuations between concentrations in male samples between 1981 and 1996 (Fig. 4); however, the 1996 females had consistently lower concentrations of all the congener groups than did the 1996 males.

Total TEQ concentrations (calculated from the most recently published TEF: Van den Berg et al. 1998) were around 20 pg/g wet wt. MO-CB usually represented about 40-50% of total TEQ, NO-CB a further 35-40%, PCDD 10-25%, and PCDF < 5% (Table 15).

Figures 5-7 show regressions of total PCDD, PCDF, and MO-CB on age in male animals. PCDD and PCDF showed no significant variation with age (Figs. 5 and 6). MO-CB concentrations generally increased with age; when the summed tetra- to hepta-chlorobiphenyls were regressed on age the relationship was not statistically significant, but the hexa- and hepta-chlorobiphenyls showed strong positive relationships with age (Fig. 7). In female samples (from 1996 only) MO-CB did not vary with age.

ACKNOWLEDGEMENTS

This work was supported in part by the Northern Contaminants Programme.

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The following abbreviations are used throughout the Tables.

RDL	Regional Dioxin Lab. (IOS)
NA	Not analysed
ND	Not detected (i.e., below detection limit)
NDR	Does not meet expected isotope ratios
NR	Not recorded
SD	Standard deviation
DL	Detection limit
PCDD	Polychlorinated dibenzo-*p*-dioxin(s)
TCDD	Tetrachlorodibenzo-*p*-dioxin(s)
PeCDD	Pentachlorodibenzo-*p*-dioxin(s)
HxCDD	Hexachlorodibenzo-*p*-dioxin(s)
HpCDD	Heptachlorodibenzo-*p*-dioxin(s)
OCDD	Octachlorodibenzo-*p*-dioxin
PCDF	Polychlorinated dibenzofuran(s)
TCDF	Tetrachlorodibenzofuran(s)
PeCDF	Pentachlorodibenzofuran(s)
HxCDF	Hexachlorodibenzofuran(s)
HpCDF	Heptachlorodibenzofuran(s)
OCDF	Octachlorodibenzofuran
CB	Chlorobiphenyl(s)

Table 1. Sample numbers and biological measurements on ringed seals (*Phoca hispida*) from Holman, NWT, in 1981, 1991, and 1996. (Data from field notebooks (TGS).)

Field no.	RDL no.	Year	Sex	Age (y)	Blubber depth (cm)	Lipid % wet wt.
PHH 81-28	970F	1981	M	6	NR	NA
PHH 81-29	971F	1981	M	6	4.8	99.8
PHH 81-8	972F	1981	M	7	5.9	100
PHH 81-6	973F	1981	M	9	4.8	101
PHH 81-7	974F	1981	M	9	4.6	101
PHH 81-41	975F	1981	M	11	4.1	97.1
PHH 81-45	976F	1981	M	10	4.7	91.2
PHH 81-43	977F	1981	M	15	3.6	95.1
PHH 81-47	979F	1981	M	15	4.7	93.2
Mean				9.78	4.65	97.4
SD				3.42	0.66	3.89
n				9	8	8
PHH 91-1	980F	1991	M	7	4.6	100
PHH 91-3	981F	1991	M	10	4.5	90.0
PHH 91-21	982F	1991	M	10	2.3	88.0
PHH 91-23	983F	1991	M	10	2	90.0
PHH 91-24	985F	1991	M	10	4.5	85.0
PHH 91-28	986F	1991	M	11	3.7	75.5
PHH 91-13	987F	1991	M	14	3.8	91.5
PHH 91-14	988F	1991	M	14	3.3	92.0
PHH 91-15	989F	1991	M	15	3	90.0
Mean				11.2	3.52	89.1
SD				2.59	0.96	6.50
n				9	9	9

Table 1 (continued).

Field no.	RDL no.	Year	Sex	Age (y)	Blubber depth (cm)	Lipid % wet wt.
PHH 96-11	2186F	1996	M	6	4.5	96.0
PHH 96-1	2181F	1996	M	8	4.4	97.5
PHH 96-2	2182F	1996	M	9	4.7	97.9
PHH 96-8	2183F	1996	M	10	4.5	96.1
PHH 96-9	2184F	1996	M	11	4.6	93.8
PHH 96-26	2187F	1996	M	11	2.8	97.3
PHH 96-40	2188F	1996	M	13	3.4	98.1
PHH 96-43	2189F	1996	M	15	3.0	93.8
PHH 96-10	2185F	1996	M	16	4.0	96.3
Mean				11.0	3.99	96.3
SD				3.24	0.73	1.62
n				9	9	9
PHH 96-32	2193F	1996	F	7	3.8	93.4
PHH 96-34	2194F	1996	F	8	2.5	93.6
PHH 96-37	2195F	1996	F	8	3.7	86.8
PHH 96-6	2190F	1996	F	10	4.5	95.0
PHH 96-39	2197F	1996	F	11	3.6	99.3
PHH 96-29	2192F	1996	F	12	1.8	NA
PHH 96-16	2191F	1996	F	14	7.5	97.7
PHH 96-38	2196F	1996	F	14	3.5	93.4
PHH 96-42	2198F	1996	F	14	2.4	89.9
Mean				10.9	3.70	93.6
SD				2.80	1.65	3.99
n				9	9	8

Table 2. PCDD concentrations (pg/g wet wt.) in blubber from Holman ringed seals (*Phoca hispida*) sampled in 1981, 1991 and 1996.
(Data summarised from IOS RDL files Rasealdf.xls, Holman96.xls and 96pcddrex.xls.)

Field sample	Year	Sex	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	Total PCDD
PHH 81-28	1981	M	3.46	0.32	ND	0.70	ND	0.30	2.20	7.0
PHH 81-29	1981	M	4.97	0.45	ND	0.49	0.10	0.85	29.30	36.2
PHH 81-8	1981	M	2.99	ND	ND	1.50	ND	0.87	8.44	13.8
PHH 81-6	1981	M	14.55	1.25	ND	1.05	0.15	0.36	0.80	18.2
PHH 81-7	1981	M	2.81	ND	ND	ND	ND	1.46	NDR(2.66)	4.3
PHH 81-41	1981	M	9.13	ND	ND	ND	ND	ND	4.36	13.5
PHH 81-45	1981	M	4.25	0.42	ND	0.68	0.16	NDR(0.63)	NDR(1.70)	5.5
PHH 81-43	1981	M	5.20	0.37	ND	0.73	ND	0.45	1.13	7.9
PHH 81-47	1981	M	4.84	0.55	ND	NDR(1.04)	NDR(0.18)	0.66	0.97	7.0
Mean			5.80	0.56	ND	0.86	0.14	0.71	2.98*	9.64*
SD			3.78	0.35		0.36	0.03	0.40	2.98*	4.89*
n			9	6		6	3	7	6*	8*
Proc. Blk. 1981			ND	ND	ND	NDR(0.16)	ND	ND	NDR(0.60)	
Mean DL 1981			0.13	0.13	0.14	0.14	0.14	0.18	0.29	
PHH 91-1	1991	M	5.10	0.95	ND	0.78	0.15	0.19	ND	7.17
PHH 91-3	1991	M	0.89	0.17	ND	0.59	0.11	ND	ND	1.76
PHH 91-21	1991	M	1.31	0.31	ND	0.63	0.14	ND	1.10	3.49
PHH 91-23	1991	M	0.41	0.15	ND	0.27	0.12	ND	0.48	1.43
PHH 91-24	1991	M	0.76	ND	ND	0.55	ND	0.08	1.14	2.53
PHH 91-28	1991	M	0.80	0.31	ND	0.70	ND	ND	1.06	2.87
PHH 91-13	1991	M	3.79	0.9	ND	0.48	ND	ND	0.56	5.73
PHH 91-14	1991	M	0.50	0.06	ND	0.45	ND	ND	0.05	1.06
PHH 91-15	1991	M	14.29	0.99	ND	0.97	0.22	ND	ND	16.5
Mean			3.09	0.48	ND	0.60	0.15	0.08, 0.19	0.73	4.72
SD			4.51	0.40		0.20	0.04		0.44	4.85
n			9	8		9	5	2	6	9
Proc. Blk. 1991			ND	ND	ND	0.16	ND	ND	0.44	
DL 1991			0.11	0.12	0.16	0.14	0.15	0.19	0.26	

* Omit data from PHH 81-29

Table 2 cont'd./2

Field sample	Year	Sex	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	Total PCDD
PHH 96-1	1996	M	6.57	0.69	ND	0.51	ND	0.15	0.74	8.66
PHH 96-2	1996	M	1.67	0.51	ND	0.74	0.12	ND	0.53	3.57
PHH 96-8	1996	M	8.26	1.91	0.20	1.70	0.32	0.20	0.73	13.3
PHH 96-9	1996	M	1.67	0.77	ND	2.06	0.22	0.14	0.48	5.34
PHH 96-10	1996	M	0.81	0.29	ND	0.43	ND	ND	0.50	2.03
PHH 96-11	1996	M	1.27	0.76	0.23	0.76	0.27	0.30	1.26	4.84
PHH 96-26	1996	M	2.07	0.52	ND	0.79	0.11	0.22	1.24	4.96
PHH 96-40	1996	M	1.38	0.58	0.12	0.87	0.10	ND	0.48	3.53
PHH 96-43	1996	M	0.75	0.26	ND	0.50	ND	ND	0.44	1.95
Mean			2.72	0.70	0.18	0.93	0.19	0.20	0.71	5.36
SD			2.73	0.49	0.06	0.57	0.09	0.06	0.32	3.60
n			9	9	3	9	6	5	9	9.0
Proc. Blk. 1996 M			ND	ND	ND	0.42	ND	ND	0.56	
DL 1996 M			0.07	0.08	0.10	0.10	0.10	0.12	0.14	
PHH 96-6	1996	F	0.93	0.48	ND	0.52	0.13	0.13	0.58	2.77
PHH 96-16	1996	F	0.55	0.11	ND	0.36	0.10	ND	0.49	1.60
PHH 96-29	1996	F	1.87	0.96	0.16	0.97	0.23	0.25	0.97	5.41
PHH 96-32	1996	F	0.60	0.34	ND	0.51	ND	ND	0.64	2.09
PHH 96-37	1996	F	0.36	NDR(0.16)	ND	0.42	ND	ND	0.54	1.32
PHH 96-38	1996	F	0.49	0.24	ND	0.45	ND	0.18	0.69	2.05
PHH 96-39	1996	F	0.98	0.36	ND	0.60	0.22	1.02	4.56	7.74
PHH 96-34	1996	F	1.17	0.49	0.14	0.63	0.15	0.14	0.80	3.52
PHH 96-42	1996	F	1.89	0.29	ND	0.52	ND	ND	0.50	3.19
Mean			0.98	0.41	0.14, 0.16	0.55	0.17	0.34	1.09	3.30
SD			0.57	0.25		0.18	0.06	0.38	1.31	2.07
n			9	8	2	9	5	5	9	9
Proc. Blk. 1966 F			ND	ND	ND	0.45	ND	ND	0.44	
DL 1996 F			0.07	0.08	0.1	0.1	0.1	0.12	0.14	

Table 3. PCDF concentrations (pg/g wet wt.) in blubber from Holman Is.ringed seals (*Phoca hispida*) sampled in 1981, 1991 and 1996.
(Data summarised from IOS RDL files Rasealdf.xls, Holman96.xls and 96pcddrex.xls.)

Field sample	Year	Sex	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	2,3,4,6,7,8-HxCDF
PHH 81-28	1981	M	2.70	0.08	0.38	ND	0.06	ND
PHH 81-29	1981	M	3.01	0.53	0.39	ND	ND	ND
PHH 81-8	1981	M	2.94	0.10	ND	ND	ND	ND
PHH 81-6	1981	M	6.36	0.39	0.40	ND	ND	ND
PHH 81-7	1981	M	3.26	ND	ND	ND	ND	ND
PHH 81-41	1981	M	4.04	ND	ND	ND	ND	ND
PHH 81-45	1981	M	3.36	ND	0.26	ND	ND	ND
PHH 81-43	1981	M	3.12	ND	0.13	0.05	ND	ND
PHH 81-47	1981	M	4.27	NDR(0.14)	NDR(0.19)	0.14	ND	ND
Mean			3.67	0.28	0.31	0.05, 0.14	0.06	ND
SD			1.13	0.22	0.12			
n			9	4	5	2	1	
Proc. Blk. 1981			ND	ND	ND	ND	ND	ND
Mean DL 1981			0.10	0.10	0.10	0.11	0.10	0.11
PHH 91-1	1991	M	1.81	0.41	0.32	ND	ND	ND
PHH 91-3	1991	M	2.05	0.10	0.13	ND	ND	ND
PHH 91-21	1991	M	5.20	0.17	0.24	ND	ND	ND
PHH 91-23	1991	M	1.7	NDR(0.10)	0.12	ND	ND	ND
PHH 91-24	1991	M	2.17	ND	ND	ND	ND	ND
PHH 91-28	1991	M	3.35	NDR(0.10)	ND	ND	ND	ND
PHH 91-13	1991	M	3.35	0.13	0.36	ND	ND	ND
PHH 91-14	1991	M	2.25	ND	ND	ND	ND	ND
PHH 91-15	1991	M	1.52	0.37	0.31	ND	ND	ND
Mean			2.60	0.24	0.25	ND	ND	ND
SD			1.18	0.14	0.10			
n			9	5	6			
Proc. Blk. 1991			ND	ND	ND	ND	ND	ND
Mean DL 1991			0.10	0.10	0.10	0.12	0.11	0.12

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Table 3 cont'd./2

Field sample	Year	Sex	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	2,3,4,6,7,8-HxCDF
PHH 96-1	1996	M	1.67	0.28	0.19	ND	ND	ND
PHH 96-2	1996	M	1.77	0.41	0.40	ND	ND	ND
PHH 96-8	1996	M	1.68	0.35	0.38	ND	ND	ND
PHH 96-9	1996	M	3.07	0.46	0.28	ND	ND	ND
PHH 96-10	1996	M	2.01	0.07	0.13	ND	ND	ND
PHH 96-11	1996	M	2.61	0.56	0.41	0.20	0.16	0.22
PHH 96-26	1996	M	3.85	0.12	0.14	ND	ND	ND
PHH 96-40	1996	M	2.09	0.10	0.34	ND	ND	ND
PHH 96-43	1996	M	2.51	0.09	0.15	ND	ND	ND
Mean			2.36	0.27	0.27	0.20	0.16	0.22
SD			0.73	0.18	0.12			
n			9	9	9	1	1	1
Proc. Blk. 1996 M			0.38	ND	ND	ND	ND	ND
Mean DL 1996 M			0.05	0.06	0.06	0.08	0.08	0.08
PHH 96-6	1996	F	3.04	0.42	0.30	ND	ND	ND
PHH 96-16	1996	F	1.72	0.06	0.10	ND	ND	ND
PHH 96-29	1996	F	3.14	0.41	0.24	ND	ND	ND
PHH 96-32	1996	F	2.37	0.09	0.23	ND	ND	ND
PHH 96-34	1996	F	2.38	0.34	0.19	ND	ND	ND
PHH 96-37	1996	F	1.63	ND	0.10	ND	ND	ND
PHH 96-38	1996	F	2.60	0.08	0.13	ND	ND	ND
PHH 96-39	1996	F	3.45	0.18	0.26	ND	ND	ND
PHH 96-42	1996	F	2.33	ND	0.17	ND	ND	ND
Mean			2.52	0.23	0.19	ND	ND	ND
SD			0.62	0.16	0.07			
n			9	7	9			
Proc. Blk. 1996 F			0.16	ND	ND	ND	ND	ND
Mean DL 1996 F			0.05	0.06	0.06	0.08	0.08	0.08

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Table 3 cont'd./3

Field sample	1,2,3,7,8,9-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF	Total PCDF
PHH 81-28	ND	0.06	ND	ND	3.28
PHH 81-29	ND	ND	ND	0.80	4.73
PHH 81-8	ND	ND	ND	ND	3.04
PHH 81-6	ND	0.14	ND	ND	7.29
PHH 81-7	ND	ND	ND	ND	3.26
PHH 81-41	ND	ND	ND	ND	4.04
PHH 81-45	ND	NDR(0.43)	ND	ND	3.62
PHH 81-43	ND	0.14	ND	ND	3.44
PHH 81-47	ND	0.22	ND	ND	4.63
Mean	ND	0.14	ND	0.80	4.15
SD		0.07			1.32
n		4		1	9
Proc. Blk. 1981	ND	ND	ND	ND	
Mean DL 1981	0.12	0.13	0.15	0.39	
PHH 91-1	ND	ND	ND	ND	2.54
PHH 91-3	ND	ND	ND	ND	2.28
PHH 91-21	ND	ND	ND	ND	5.61
PHH 91-23	ND	ND	ND	ND	1.82
PHH 91-24	ND	ND	ND	ND	2.17
PHH 91-28	ND	0.34	ND	ND	3.69
PHH 91-13	ND	ND	ND	ND	3.84
PHH 91-14	ND	ND	ND	ND	2.25
PHH 91-15	ND	ND	ND	ND	2.20
Mean	ND	0.34	ND	ND	2.93
SD	ND		ND	ND	1.22
n		1			9
Proc. Blk. 1991	ND	ND	ND	ND	
Mean DL 1991	0.13	0.12	0.14	0.30	

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Table 3 cont'd./4

Field sample	1,2,3,7,8,9-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF	Total PCDF
PHH 96-1	ND	0.11	ND	ND	2.26
PHH 96-2	ND	ND	ND	0.17	2.75
PHH 96-8	ND	ND	ND	ND	2.41
PHH 96-9	ND	ND	ND	ND	3.82
PHH 96-10	ND	ND	ND	ND	2.21
PHH 96-11	0.21	0.33	0.19	0.86	5.74
PHH 96-26	ND	0.19	ND	0.18	4.49
PHH 96-40	ND	ND	ND	ND	2.53
PHH 96-43	ND	ND	ND	ND	2.75
Mean	0.21	0.21	0.19	0.40	3.22
SD		0.11		0.40	1.22
n	1	3	1	3	9
Proc. Blk. 1996 M	ND	ND	ND	ND	
Mean DL 1996 M	0.08	0.10	0.10	0.12	
PHH 96-6	ND	ND	ND	ND	3.76
PHH 96-16	ND	ND	ND	ND	1.88
PHH 96-29	ND	ND	ND	ND	3.79
PHH 96-32	ND	ND	ND	ND	2.69
PHH 96-34	ND	0.12	ND	0.14	3.17
PHH 96-37	ND	ND	ND	ND	1.73
PHH 96-38	ND	ND	ND	ND	2.81
PHH 96-39	ND	0.15	ND	ND	4.04
PHH 96-42	ND	ND	ND	ND	2.50
Mean	ND	0.12, 0.15	ND	0.14	2.93
SD					0.83
n		2		1	9
Proc. Blk. 1996 F	ND	ND	ND	ND	
Mean DL 1996 F	0.08	0.1	0.1	0.12	

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Table 4. Non-*ortho* chlorobiphenyls (NO-CB) (pg/g wet wt.) in blubber of ringed seals (*Phoca hispida*) from Holman, NWT, in 1981, 1991 and 1996. (Data from IOS RDL files Rasealcdf.xls, Holman96.xls and PCDDrex.xls.).)

Field sample	Year	Sex	CB 11	CB 12	CB 13	CB 14	CB 15	CB 35	CB 36	CB 37	CB 38	CB39
PHH 81-28	1981	M	6.86	ND	3.07	ND	24.5	0.81	ND	18.1	0.17	0.39
PHH 81-29	1981	M	7.55	ND	3.65	ND	24.2	0.56	ND	8.12	ND	0.51
PHH 81-8	1981	M	37.2	ND	19.0	ND	159	2.66	ND	43.6	ND	0.53
PHH 81-6	1981	M	5.40	ND	2.13	ND	13.3	1.28	ND	29.4	ND	0.35
PHH 81-7	1981	M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PHH 81-41	1981	M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PHH 81-45	1981	M	3.26	ND	1.41	ND	4.68	3.83	ND	92.3	ND	0.55
PHH 81-43	1981	M	2.20	ND	1.06	ND	6.89	3.88	ND	137	ND	0.29
PHH 81-47	1981	M	2.72	ND	1.72	ND	6.96	NDR(0.66)	ND	14.7	ND	0.41
Mean			9.31	ND	4.57	ND	34.1	2.17	ND	49.0	0.17	0.43
SD			12.5		6.41		55.4	1.49		47.9		0.10
n			7		7		7	6		7	1	7
Proc. Blk. 1981			0.46	ND	0.23	ND	2.34	ND	ND	1.18	ND	ND
Mean DL 1981			0.22	0.22	0.22	0.22	0.22	0.17	0.17	0.17	0.17	0.17
PHH 91-1	1991	M	1.16	ND	0.63	ND	2.62	0.20	ND	3.79	ND	NDR(0.20)
PHH 91-3	1991	M	4.90	ND	2.12	ND	15.0	0.32	ND	5.33	ND	0.43
PHH 91-21	1991	M	1.96	ND	0.91	ND	5.71	0.25	ND	4.67	0.31	0.78
PHH 91-23	1991	M	2.63	ND	0.87	ND	5.23	ND	ND	3.81	0.24	0.39
PHH 91-24	1991	M	2.49	ND	ND	ND	6.62	0.32	ND	4.07	ND	ND
PHH 91-28	1991	M	2.50	ND	0.95	ND	5.17	0.30	ND	3.88	ND	0.39
PHH 91-13	1991	M	1.14	ND	ND	ND	2.12	ND	ND	3.10	ND	NDR(0.71)
PHH 91-14	1991	M	2.51	ND	0.65	ND	6.18	0.26	ND	3.98	ND	0.28
PHH 91-15	1991	M	1.00	ND	ND	ND	1.96	0.40	ND	6.69	ND	0.32
Mean			2.25	ND	1.02	ND	5.63	0.29	ND	4.37	0.31, 0.24	0.43
SD			1.19		0.56		3.95	0.06		1.07		0.18
n			9		6		9	7		9	2	6
Proc. Blk. 1991			0.96	ND	0.36	ND	2.4	0.09	ND	0.99	ND	ND
Mean DL 1991			0.44	0.44	0.44	0.44	0.44	0.18	0.18	0.18	0.18	0.18

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Table 4 cont'd./2

Field sample	Year	Sex	CB 11	CB 12	CB 13	CB 14	CB 15	CB 35	CB 36	CB 37	CB 38	CB39
PHH 96-1	1996	M	4.46	ND	1.11	ND	7.16	ND	ND	6.29	ND	ND
PHH 96-2	1996	M	3.89	ND	0.78	ND	4.99	ND	ND	2.76	ND	ND
PHH 96-8	1996	M	3.59	ND	1.32	ND	5.41	ND	ND	3.61	ND	ND
PHH 96-9	1996	M	4.46	ND	1.33	ND	5.33	ND	ND	4.93	ND	ND
PHH 96-10	1996	M	4.54	ND	1.82	ND	6.73	ND	ND	5.91	ND	ND
PHH 96-11	1996	M	5.41	ND	1.23	ND	6.79	ND	ND	4.97	1.46	ND
PHH 96-26	1996	M	3.86	ND	1.42	ND	5.17	ND	ND	4.96	ND	ND
PHH 96-40	1996	M	3.73	ND	1.34	ND	5.88	ND	ND	4.26	ND	ND
PHH96-43	1997	M	4.23	ND	1.71	ND	7.60	ND	ND	5.47	ND	ND
Mean			4.24	ND	1.34	ND	6.12	ND	ND	4.80	1.46	ND
SD			0.56		0.31		0.97			1.11		
n			9		9		9	9		9	1	1
Proc. Blk. 1996 M			4.23	ND	1.38	ND	8.09	ND	ND	10.8	ND	ND
Mean DL 1996 M			0.05	0.05	0.05	0.05	0.05	0.46	0.47	0.47	0.47	0.47
PHH 96-6	1996	F	2.99	ND	1.31	ND	5.21	0.26	ND	4.15	1.09	0.48
PHH 96-16	1996	F	4.11	ND	1.50	ND	5.83	0.34	ND	4.60	0.41	0.35
PHH 96-29	1996	F	5.38	ND	1.60	ND	8.27	0.78	ND	18.4	0.55	0.31
PHH 96-32	1996	F	4.46	ND	1.08	ND	6.69	0.30	0.10	5.54	0.88	0.39
PHH 96-34	1996	F	3.26	ND	1.32	ND	5.81	0.23	ND	4.37	1.15	0.37
PHH 96-37	1996	F	2.80	ND	ND	ND	6.11	0.30	0.08	5.46	0.69	0.23
PHH 96-38	1996	F	3.92	ND	0.98	ND	7.59	1.24	ND	33.9	0.79	0.41
PHH 96-39	1996	F	7.41	ND	ND	ND	28.7	156.1	ND	6203.2	ND	ND
PHH 96-42	1996	F	3.63	ND	1.54	ND	6.52	0.18	ND	4.33	0.72	0.54
Mean (omit 96-39)			3.82	ND	1.33	ND	6.50	0.45	0.08, 0.10	10.1	0.78	0.39
SD (omit 96-39)			0.85		0.23		1.01	0.37		10.8	0.25	0.10
n			8		7		8	8	2	8	8	8
Proc. Blk. 1996 F			2.89	ND	ND	ND	6.19	0.62	ND	9.65	ND	ND
Mean DL 1996 F			0.16	0.16	0.16	1.72	0.16	0.07	0.07	0.07	0.07	0.07

Table 4 cont'd./3

Field sample	CB 77	CB 78	CB 79	CB80	CB81	CB 126	CB 127	CB 169	Total NO CB
PHH 81-28	26.7	ND	0.75	30.2	3.20	96.2	200	16.3	427
PHH 81-29	17.5	ND	0.79	129	6.90	90.8	494	6.62	790
PHH 81-8	20.3	ND	0.91	45.3	3.30	47.9	256	6.72	641
PHH 81-6	38.0	ND	0.88	111	21.0	133	212	9.44	577
PHH 81-7	NA	NA	NA	NA	NA	NA	NA	NA	NA
PHH 81-41	NA	NA	NA	NA	NA	NA	NA	NA	NA
PHH 81-45	35.7	ND	0.85	37.9	5.88	92.9	318	8.37	606
PHH 81-43	46.1	ND	0.65	28.9	4.67	79.2	382	7.39	699
PHH 81-47	26.4	ND	0.90	109	6.43	102	830	7.24	1109
Mean	30.1	ND	0.82	70.3	7.34	91.8	384	8.87	693
SD	10.2		0.10	44.0	6.19	25.5	222	3.43	215
n	7		7	7	7	7	7	7	7
Proc. Blk. 1981	0.23	ND	0.05	0.22	ND	ND	0.19	ND	
Mean DL 1981	0.14	0.15	0.14	0.13	0.14	0.11	0.11	0.06	
PHH 91-1	11.5	ND	NDR(0.51)	93.2	12.9	90.3	386	5.23	607
PHH 91-3	16.6	ND	0.68	16.2	2.96	51.2	233	NDR(6.50)	349
PHH 91-21	36.1	ND	1.72	69.0	8.12	99.2	267	14.2	510
PHH 91-23	14.1	ND	0.66	24.6	2.66	45.5	226	9.63	337
PHH 91-24	18.3	ND	0.81	17.9	3.77	49.3	114	6.96	224
PHH 91-28	21.2	ND	0.67	32.3	8.40	82.6	215	10.9	384
PHH 91-13	18.9	ND	0.96	45.1	7.82	134	279	10.9	504
PHH 91-14	13.2	ND	0.71	12.6	2.03	67.6	59	16.7	185
PHH 91-15	10.0	ND	0.89	143	9.85	205	612	13.1	1004
Mean	17.8	ND	0.89	50.4	6.50	91.6	266	10.9	456
SD	7.79		0.35	43.8	3.78	51.1	160	3.76	246
n	9		8	9	9	9	9	8	9
Proc. Blk. 1991	0.25	ND	ND	0.29	ND	0.13	NDR(0.91)	ND	
Mean DL 1991	0.13	0.13	0.13	0.12	0.13	0.19	0.17	0.09	

Table 4 cont'd./4

Field sample	CB 77	CB 78	CB 79	CB80	CB81	CB 126	CB 127	CB 169	Total NO CB
PHH 96-1	11.0	ND	0.35	77.5	ND	50.3	3.72	5.53	167
PHH 96-2	7.84	ND	ND	94.3	ND	164	14.6	15.7	308
PHH 96-8	9.08	ND	0.51	128.9	ND	134	10.1	5.71	302
PHH 96-9	12.8	ND	0.52	93.5	ND	88.3	6.26	7.73	225
PHH 96-10	10.5	ND	0.34	26.1	ND	43.1	4.88	13.0	117
PHH 96-11	15.2	ND	0.44	61.8	ND	70.2	7.23	6.14	181
PHH 96-26	22.7	ND	0.97	61.1	ND	108	7.94	8.13	224
PHH 96-40	9.16	ND	0.30	41.2	ND	132	20.7	21.4	239
PHH 96-43	12.8	ND	0.56	29.8	ND	88.9	14.5	12.7	178
Mean	12.3	ND	0.50	68.2	ND	97.5	9.99	10.7	216
SD	4.50		0.21	33.8		40.3	5.55	5.43	62.7
n	9		8	9		9	9	9	9
Proc. Blk. 1996 M	2.03	ND	0.07	57.2		90.1	ND	9.44	
Mean DL 1996 M	0.04	0.04	0.04	27.2		38.9		5.77	
PHH 96-6	17.0	ND	0.36	64.2	ND	73.9	6.27	N/A	177
PHH 96-16	12.5	ND	0.41	18.0	ND	28.8	5.04	7.45	89
PHH 96-29	18.8	ND	0.15	105.9	ND	89.4	6.47	9.62	266
PHH 96-32	11.7	ND	0.42	28.5	ND	61.9	7.29	7.83	137
PHH 96-34	13.2	ND	0.43	86.8	ND	56.4	4.54	5.51	183
PHH 96-37	11.1	ND	0.29	17.5	ND	38.8	6.49	6.94	97
PHH 96-38	17.3	ND	0.55	36.8	ND	39.3	4.49	7.50	155
PHH 96-39	1108.7	2.95	3.53	103.8	ND	75.4	10.4	13.0	7713
PHH 96-42	16.8	ND	0.67	31.7	ND	67.8	7.02	8.45	150
Mean (omit 96-39)	14.8	ND	0.41	48.7	ND	57.0	5.95	7.61	157
SD (omit 96-39)	3.00		0.17	33.2		20.4	1.11	1.27	55.5
n	8		8	8		8	8	7	8
Proc. Blk. 1996 F	1.55	ND	ND	1.08	0.8	0.99	ND	NDR(20.5)	
Mean DL 1996 F	0.08	0.08	0.08	0.08	0.07	0.07	0.06	0.98	

Table 5. MO-CB concentrations (pg/g wet wt.) in blubber of ringed seals (*Phoca hispida*) from Holman, NWT, sampled in 1981, 1991 and 1996.
(Data from IOS RDL files Rasealdf.xls, Holman96.xls and 96pcddrex.xls.)

SAMPLE	Year	Sex	PCB6	PCB7,9	PCB8,5	TOTDICB	PCB21	PCB22	PCB23	PCB25	PCB26	PCB28	PCB29	PCB31	PCB33,20	TOTTRICB
PHH 81-28	1981	M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PHH 81-29	1981	M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PHH 81-8	1981	M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PHH 81-6	1981	M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PHH 81-7	1981	M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PHH 81-41	1981	M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PHH 81-45	1981	M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PHH 81-43	1981	M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PHH 81-47	1981	M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mean																
SD																
n																
Proc blk			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mean DL			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PHH 91-1	1991	M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PHH 91-3	1991	M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PHH 91-21	1991	M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PHH 91-23	1991	M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PHH 91-24	1991	M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PHH 91-28	1991	M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PHH 91-13	1991	M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PHH 91-14	1991	M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PHH 91-15	1991	M	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mean																
SD																
n																
Proc blk																
Mean DL																

Table 5 cont'd./2

PHH 96-1	1996	M	NA	NA	NA	NA	ND	42.8	ND	22.9	155	6990	ND	1150	66.1	8430
PHH 96-2	1996	M	ND	ND	14.9	14.9	ND	81.8	ND	25.3	180	10200	ND	2460	86.5	13100
PHH 96-8	1996	M	8.50	ND	32.3	40.8	ND	210	ND	46.9	231	9640	ND	3150	318	13600
PHH 96-9	1996	M	NA	NA	NA	NA	ND	89.4	ND	33.9	249	13000	ND	2430	114	15900
PHH 96-10	1996	M	NA	NA	NA	NA	ND	64.3	ND	18.5	85.4	10050	ND	2300	79.2	12600
PHH 96-11	1996	M	ND	ND	20.5	20.5	ND	112	3.8	32.1	236	10400	ND	2080	85.3	13000
PHH 96-26	1996	M	ND	ND	41.3	41.3	ND	111	ND	32.8	184	29000	ND	5420	227	34900
PHH 96-40	1996	M	NA	NA	NA	NA	NA	98.7	NA	24.9	97.5	14900	NA	3700	136	19000
PHH 96-43	1996	M	NA	NA	NA	NA	ND	48.0	ND	13.9	70.0	21000	ND	2970	127	24300
Mean			8.50		27.2	29.4		95.3	3.8	27.9	165	13909		2850	138	17199
SD					11.8	13.7		49.8		9.78	68.1	6941		1201	82.9	8023
n			1		4	4		9	1	9	9	9		9	9	9
Proc blk			8.8	6.5	12.2		ND	10.2	ND	4.1	10.5	50.8	1.5	33.0	22.5	
Mean DL			3.8	3.8	3.8		1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	
PHH 96-6	1996	F	NA	NA	NA	NA	ND	42.3	ND	22.4	162	11835	ND	1381	82.6	13526
PHH 96-16	1996	F	NA	NA	NA	NA	ND	34.6	ND	14.9	66.9	5066	ND	896	150	6228
PHH 96-29	1996	F	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
PHH 96-32	1996	F	NA	NA	NA	NA	ND	50.3	ND	17.7	91.9	9715	ND	1433	90.7	11399
PHH 96-34	1996	F	NA	NA	NA	NA	NA	47.8	NA	25.4	161	12428	NA	2732	109	15503
PHH 96-37	1996	F	NA	NA	NA	NA	ND	43.3	ND	10.7	52.1	9530	ND	1516	98.4	11250
PHH 96-38	1996	F	NA	NA	NA	NA	ND	43.6	ND	18.6	97.1	9379	ND	878	101	10517
PHH 96-39	1996	F	NA	NA	NA	NA	ND	606	ND	72.8	203	10770	ND	4345	709	16706
PHH 96-42	1996	F	NA	NA	NA	NA	ND	119	ND	24.4	103	9066	ND	2365	173	11849
Mean								123		25.9	117	9724		1943	189	12122
SD								197		19.6	52.6	2241		1169	212	3231
n								8		8	8	8		8	8	8
Proc blk			NDR(1.7)	0.2	0.2		ND	9.4	ND	2.2	3.5	46.7	0.4	35.7	19.5	
Mean DL							1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	

Table 5 cont'd./3

PCB55	PCB56,60	PCB57	PCB58	PCB61,74	PCB63	PCB66	PCB67	PCB68	PCB70,76	PCB72	TOTTECB	PCB105	PCB108,107
12.7	3080	NA	166	13400	NA	6890	NA	21.0	5760	53.4	29383	14600	2310
23.0	4190	NA	330	14200	NA	12100	NA	85.7	3680	50.5	34659	16700	3380
ND	2660	NA	79.9	12500	NA	5150	NA	19.7	3000	35.8	23445	9920	1280
51.5	10600	NA	925	27800	NA	35800	NA	145	8200	79.6	83601	30100	6600
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
17.2	5000	NA	126	27600	NA	9750	NA	15.5	4650	53.8	47212	22200	3380
12.4	4140	NA	41.7	34900	NA	5790	NA	20.7	2680	15.5	47600	33100	2150
ND	5560	NA	117	29100	NA	10600	NA	92.0	4640	62.8	50172	28800	3730
23.4	5030		255	22800		12300		57.1	4660	50.2	45200	22200	3260
16.3	2650		310	9150		10700		50.9	1890	20.2	19800	8790	1710
6	7		7	7		7		7	7	7	7	7	7
ND	1.55	NA	ND	ND	NA	1.78	NA	ND	2.29	ND		1.60	0.28
2.92	2.92	NA	2.92	2.92	NA	2.92	NA	2.92	2.92	2.92		3.08	2.92
ND	4630	NA	248	10300	NA	14900	NA	23.7	927	9.79	31038	29200	3460
ND	1670	NA	6.25	14300	NA	2780	NA	9.38	1770	24.0	20559	13800	1330
ND	2600	NA	70.2	11000	NA	5590	NA	29.6	3370	34.6	22694	16400	2200
1.89	2130	NA	38.2	12600	NA	4190	NA	7.84	2570	32.6	21571	15100	1960
ND	1680	NA	25.7	9140	NA	2970	NA	5.39	1560	9.45	15391	12000	1180
ND	3090	NA	73.7	15700	NA	6320	NA	10.2	3250	30.6	28474	14800	2140
8.75	4480	NA	70.9	17000	NA	10500	NA	15.9	2670	20.9	34766	35600	3980
3.52	1760	NA	19.7	15300	NA	2720	NA	5.11	1350	6.85	21165	17100	1110
11.5	5240	NA	626	17900	NA	19400	NA	60.1	1540	28.5	44806	34100	5170
6.42	3030		131	13700		7710		18.6	2110	21.9	26700	20900	2500
4.48	1410		199	3090		5990		17.7	875	10.8	9040	9320	1410
4	9		9	9		9		9	9	9	9	9	9
ND	1.90		ND	4.93		2.72		ND	2.07	ND		10.7	0.89
2.21	2.21		2.21	2.21		2.21		2.21	2.21	2.21		3.2	2.93

Table 5 cont'd./4

7.64	2170	2.66	4.36	7750	321	8700	9.39	52.2	1550	32.2	20590	9880	2090
13.1	3110	4.07	4.33	12200	505	13900	7.44	85.2	1500	39.7	31400	20300	4030
16.0	3970	2.70	ND	14100	663	17300	5.70	50.5	13901	23.1	37600	47000	4880
18.4	3320	4.81	7.16	10900	398	12600	13.7	81.0	2160	35.3	29600	16800	3360
7.86	1670	ND	ND	11900	40.6	3500	7.5	8.4	1580	17.6	18700	12500	1380
6.80	2590	NDR(3.7)	NDR(5.4)	10300	287	9400	13.8	67.6	1790	32.5	24500	14700	2510
7.60	4300	ND	ND	33000	76.0	8460	12.0	21.7	3040	41.9	48900	40100	3160
ND	2800	1.60	2.00	21100	57.7	5480	7.3	13.3	1940	26.7	31400	28100	2330
7.20	2500	ND	ND	35200	33.7	3930	5.9	ND	1690	18.7	43400	32300	1820
10.6	2936	3.17	4.46	17383	265	9259	9.18	47.5	1849	29.7	31800	24639	2840
4.60	840	1.27	2.11	10154	229	4676	3.20	30.1	505	8.76	10100	13005	1121
8	9	5	4	9	9	9	9	9	9	9	9	9	9
0.2	8.8	ND	0.1	9.9	0.5	12.7	0.7	ND	14.4	ND		4.8	0.8
1	1	1	1	1	1	1	1	1	1	1		2	2
12.5	3079	3.90	4.70	11628	293	10528	10.8	96.1	2113	39.9	27809	14698	2501
NDR(5.6)	769	1.91	ND	3900	38.2	2173	7.98	7.87	1274	17.2	8189	4129	697
19.0	3022	ND	ND	10245	328	12364	10.2	68.4	1813	32.6	27902	22341	4662
8.10	1730	1.48	ND	9791	40.9	3819	7.50	7.43	1473	18.6	16898	11530	1272
16.4	2475	2.30	3.90	9303	215	8466	8.00	51.0	1307	17.0	21865	15388	2346
4.41	861	ND	ND	7023	15.5	1576	3.30	3.84	805	4.81	10297	12583	684
13.5	1485	ND	ND	8701	36.3	3097	10.0	7.12	1460	19.6	14829	12295	1353
392	10839	20.1	19.1	11974	220	14847	272	28.6	11041	32.5	49686	11974	1628
6.1	1217	ND	ND	8836	33.6	2532	6.90	6.00	1346	16.6	13999	12992	1245
59.0	2831	5.94	9.23	9044	136	6600	37.4	30.7	2515	22.1	21300	13103	1821
135	3125	7.97	8.55	2450	127	5019	88.0	33.7	3218	10.8	12700	4721	1238
8	9	5	3	9	9	9	9	9	9	9	9	9	9
NDR(0.2)	9.1	ND	ND	13	0.6	15.9	0.6	0.2	12.1	ND		18.3	3.9
1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9		1.5	1.5

Table 5 cont'd./5

PCB111	PCB114	PCB118,106	PCB120	PCB122	PCB123	PCB124	TOTPECB	PCB156	PCB157	PCB159	PCB162	PCB167
50.3	1080	35200	NA	55.6	958	354	54608	3090	754	ND	153	612
189	1180	46400	NA	ND	ND	108	67957	2620	710	14.3	223	1020
94.0	719	22500	NA	ND	91.0	120	34724	1430	376	ND	79.7	308
61.5	2140	86500	NA	ND	1300	216	126917	4150	1110	28.5	372	2620
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
72.0	1810	58300	NA	ND	ND	160	85921	3670	996	ND	205	561
130	2730	71200	NA	ND	ND	133	109442	7320	2070	4.97	165	437
560	2190	72500	NA	ND	ND	190	107970	4810	1320	18.9	255	777
165	1690	56100		55.6	783	183	83900	3870	1050	16.7	207	905
180	721	22700			623	84.7	33200	1870	544	9.77	91.8	791
7	7	7		1	3	7	7	7	7	4	7	7
ND	NDR(0.11)	6.65	NA	ND	ND	0.24		4.17	NDR(0.49)	ND	ND	1.83
2.92	3.06	2.55	NA	2.92	2.99	2.92		6.94	7.45	7.25	7.15	6.97
61.5	1630	71900	NA	ND	2200	34.6	108486	3120	1120	13.0	219	1700
8.67	1090	29800	NA	ND	ND	85.0	46114	2540	819	ND	87.3	186
253	1150	39400	NA	ND	ND	202	59605	2850	870	7.11	158	585
145	1120	34600	NA	ND	159	143	53228	3000	939	2.63	136	428
8.35	859	25492	NA	ND	ND	79.9	39619	2170	679	ND	80.6	240
NDR(9.27)	1050	35715	NA	ND	372	116	54192	1840	614	ND	115	327
111	2490	91407	NA	ND	1900	102	135590	7060	2190	9.12	366	1540
9.52	1370	34461	NA	ND	588	89.9	54728	4080	1190	ND	71.0	238
176	2170	92003	NA	ND	1450	31.8	135101	4560	1520	38.8	388	2130
96.6	1440	50500			1110	98.3	76300	3470	1100	14.1	180	819
90.7	556	26800			854	52.6	38800	1600	493	14.3	121	753
8	9	9			6	9	9	9	9	5	9	9
NDR(0.26)	0.60	25.9		ND	1.13	0.34		8.88	1.44	ND	NDR(0.23)	3.85
2.93	3.18	2.47		2.93	2.88	2.93		5.04	5.41	5.16	5.17	5.06

Table 5 cont'd./6

57.4	672	30800	138	ND	482	29.0	44100	1240	486	6.14	127	756
120	1460	61600	282	ND	1080	30.4	89000	3520	1160	20.3	270	1990
184	2900	134000	284	ND	1120	ND	190000	7600	2650	30.4	444	3180
77.7	1150	50200	186	ND	836	43.1	72700	2570	837	13.2	208	1472
50.8	975	31500	60	ND	ND	42.3	46500	2020	726	NDR(2.0)	79.8	219
82.7	1050	42100	138	ND	523	41.7	61200	2170	707	9.29	136	906
165	2960	96400	342	ND	ND	81.5	143300	7260	2420	NDR(6.9)	226	770
122	2210	66500	159	ND	ND	45.4	99500	6810	1990	ND	194	590
121	2790	68900	387	ND	ND	54.9	106000	8590	2600	ND	141	318
109	1797	64642	219		808	46.0	94700	4641	1509	15.9	203	1133
46	918	33126	109		300	16.5	47600	2872	896	9.70	108	946
9	9	9	9		5	8	9	9	9	5	9	9
ND	0.6	11.2	0.3	ND	ND	0.5		1.0	1.8	ND	ND	ND
2	2	2	2	2	2	2		1.2	1.2	1.2	1.2	1.2
50.9	1084	40458	141	ND	693	50.7	59677	2018	726	9.53	137	968
37.3	305	11709	76.3	ND	ND	44.6	16997	709	237	NDR(1.6)	48.3	193
95.2	1590	72985	255	ND	1185	49.1	103163	3785	1438	NDR(18.9)	369	2330
46.3	845	31162	53.5	ND	ND	38.8	44947	1984	640	3.20	91.1	303
35.0	1174	45041	116	ND	621	32.6	64754	2160	818	8.09	154	988
15.4	936	24727	17.8	ND	ND	40.3	39003	2974	979	ND	52.9	140
54.3	939	28638	59.8	ND	ND	59.4	43398	1722	601	NDR(1.8)	86.9	312
56.6	823	30338	81.2	66.2	240	155	45362	1594	520	4.01	86.1	448
41.1	1060	34654	50.1	ND	ND	44.7	50086	2800	929	NDR(4.2)	111	307
48.0	973	35524	94.6	66.2	685	57.3	51900	2194	765	6.21	126	666
21.7	341	16941	70.5		388	37.5	23500	892	338	3.08	97.5	698
9	9	9	9	1	4	9	9	9	9	4	9	9
ND	1.2	0.2	ND	ND	ND	0.7		3.9	2.7	ND	ND	1.1
1.5	1.5	1.5	1.5	1.5	1.5	1.5		1.3	1.3	1.3	1.3	1.3

Table 5 cont'd./7

TOTHXCB	PCB189	TOTHPCB	TOT CB	TOT4-7CB
4610	63.0	63.0	88663	88663
4587	50.3	50.3	107253	107253
2194	29.1	29.1	60393	60393
8280	81.7	81.7	218881	218881
NA	NA	NA	NA	NA
NA	NA	NA	NA	NA
5432	55.6	55.6	138621	138621
9997	143	143	167182	167182
7180	83.6	83.6	165406	165406
6040	72.3	72.30	135000	135000
2620	36.2	36.2	54000	54000
7	7	7	7	7
	NDR(0.64)			
	1.52			
6170	49.4	49.4	146000	146000
3630	44.9	44.9	70400	70400
4470	78.1	78.1	86800	86800
4510	61.5	61.5	79400	79400
3170	62.1	62.1	58200	58200
2900	23.0	23.0	85600	85600
11200	195	195	182000	182000
5580	130	130	81600	81600
8600	88.4	88.4	189000	189000
5580	81.3	81.3	109000	109000
2740	52.2	52.2	49800	49800
9	9	9	9	9
	0.89			
	1.29			

Table 5 cont'd./8

2610	35.7	35.7	82800	67400
6970	123	123	151000	127000
13900	197	197	265000	242000
5100	82.6	82.6	136000	107000
3040	54.6	54.6	91000	68000
3920	59.2	59.2	113000	89600
10700	183	183	267000	203000
9590	276	276	175000	141000
11600	268	268	207000	162000
7500	142	142	165291	134000
4110	92.3	92.3	69106	59800
9	9	9	9	9
	ND			
	0.7			
3859	59.6	59.6	116766	91405
1187	34.3	34.3	37701	26408
7923	105	105	139093	139093
3021	71.4	71.4	86052	64937
4128	59.7	59.7	118738	90808
4146	97.9	97.9	74325	53545
2721	42.2	42.2	80886	60991
2653	54.6	54.6	125231	97755
4147	95.5	95.5	89242	68327
3750	68.9	68.9	96448	77000
1850	25.3	25.3	31423	32200
9	9	9	9	9
	0.1			
	0.7			

Table 6. Summary of age, blubber thickness and blubber lipid content in samples of ringed seal (*Phoca hispida*) from Holman NWT, 1981 – 1996 (data from Table 1). Data are presented as mean ± SD (no. of samples). Data in the same row followed by the same letter do not differ significantly by *t*-test ($P > 0.05$).

Variable	1981 (male)	1991 (male)	1996 (male)	1996 (female)
Age (y)	9.78 ± 3.42 a (9)	11.2 ± 2.59 a (9)	11.0 ± 3.24 a (9)	10.9 ± 2.80 a (9)
Blubber thickness (cm)	4.65 ± 0.66 a (8)	3.52 ± 0.96 b (9)	3.99 ± 0.73 ab (9)	3.70 ± 1.65 ab (9)
Lipid % wet wt.	97.4 ± 3.89 a (8)	89.1 ± 6.50 b (9)	96.3 ± 1.62 a (9)	93.6 ± 3.99 ab (8)

Table 7. Mean concentrations and statistical analyses of PCDD in blubber of ringed seals (*Phoca hispida*) from Holman, NWT, in 1981, 1991 and 1996. Data as pg/g tissue wet wt. (mean ± SD (no of samples in which residues were found)). (Data from Table 2.) Data in the same row followed by the same letter do not differ significantly by *t*-test ($P > 0.05$)

Compound	1981 (male)	1991 (male)	1996 (male)	1996 (female)
2,3,7,8-TCDD	5.80 ± 3.78 (9) a	3.09 ± 4.51 (9) a	2.72 ± 2.73 (9) ab	0.98 ± 0.57 (9) b
1,2,3,7,8-PeCDD	0.56 ± 0.35 (6) a	0.48 ± 0.40 (8) a	0.70 ± 0.49 (9) a	0.41 ± 0.25 (8) a
1,2,3,4,7,8-HxCDD	ND	ND	0.18 ± 0.06 (3)	0.14, 0.16 (2)
1,2,3,6,7,8-HxCDD	0.86 ± 0.36 (6) a	0.60 ± 0.20 (9) a	0.93 ± 0.57 (9) ab	0.55 ± 0.18 (9) b
1,2,3,7,8,9-HxCDD	0.14 ± 0.03 (3) a	0.15 ± 0.04 (5) a	0.19 ± 0.09 (6) a	0.17 ± 0.06 (5) a
1,2,3,4,6,7,8-HpCDD	0.71 ± 0.40 (7) a	0.19, 0.08 (2)	0.20 ± 0.06 (5) b	0.34 ± 0.38 (5) ab
OCDD	2.98 ± 2.98 (6) a	0.73 ± 0.44 (6) a	0.71 ± 0.32 (9) a	1.09 ± 1.31 (9) a
Total PCDD	9.64 ± 4.89 (8) a	4.72 ± 4.85 (9) a	5.36 ± 3.60 (9) ab	3.30 ± 2.07 (9) b

Table 8. Mean concentrations and statistical analyses of PCDF in blubber of ringed seals (*Phoca hispida*) from Holman, NWT, in 1981, 1991 and 1996. Data as pg/g tissue wet wt. (mean ± SD (no of samples in which residues were found)). (Data from Table 3.) Data in the same row followed by the same letter do not differ significantly by *t*-test ($P > 0.05$)

Compound	1981 (male)	1991 (male)	1996 (male)	1996 (female)
2,3,7,8-TCDF	3.67 ± 1.13 (9) a	2.60 ± 1.18 (9) ab	2.36 ± 0.73 (9) b	2.52 ± 0.62 (9) b
1,2,3,7,8-PeCDF	0.28 ± 0.22 (4) a	0.24 ± 0.14 (5) a	0.27 ± 0.18 (9) a	0.23 ± 0.16 (7) a
2,3,4,7,8-PeCDF	0.31 ± 0.12 (5) a	0.25 ± 0.10 (6) a	0.27 ± 0.12 (9) ab	0.19 ± 0.07 (9) b
1,2,3,4,7,8-HxCDF	0.05, 0.14 (2)	ND	0.20 (1)	ND
1,2,3,6,7,8-HxCDF	0.06 (1)	ND	0.16 (1)	ND
2,3,4,6,7,8-HxCDF	ND	ND	0.22 (1)	ND
1,2,3,7,8,9-HxCDF	ND	ND	0.21 (1)	ND
1,2,3,4,6,7,8-HpCDF	0.14 ± 0.07 (4) a	0.34 (1)	0.21 ± 0.11 (3) a	0.12, 0.15 (2)
1,2,3,4,7,8,9-HpCDF	ND	ND	0.19 (1)	ND
OCDF	0.80 (1)	ND	0.40 ± 0.40 (3)	0.14 (1)
Total PCDF	4.15 ± 1.32 (9) a	2.93 ± 1.22 (9) ab	3.22 ± 1.22 (9) ab	2.93 ± 0.83 (9) ab

Table 9. Mean concentrations and statistical analyses of NO-CB in blubber of ringed seals (*Phoca hispida*) from Holman, NWT, in 1981, 1991 and 1996. Data as pg/g tissue wet wt. (mean ± SD (no of samples in which residues were found)). (Data from Table 4.) Data in the same row followed by the same letter do not differ significantly by *t*-test ($P > 0.05$)

Chlorobiphenyl	1981 (male)	1991 (male)	1996 (male)	1996 (female)
CB 11	9.31 ± 12.5 (7) ab	2.25 ± 1.19 (9) a	4.24 ± 0.56 (9) b	3.82 ± 0.85 (8) b
CB 12	ND	ND	ND	ND
CB 13	4.57 ± 6.41 (7) a	1.02 ± 0.56 (6) a	1.34 ± 0.31 (9) a	1.33 ± 0.23 (7) a
CB 14	ND	ND	ND	ND
CB 15	34.1 ± 55.4 (7) a	5.63 ± 3.95 (9) a	6.12 ± 0.97 (9) a	6.50 ± 1.01 (8) a
CB 35	2.17 ± 1.49 (6) a	0.29 ± 0.06 (7) b	ND	0.45 ± 0.37 (8) b
CB 36	ND	ND	ND	0.08, 0.10 (2)
CB 37	49.0 ± 47.9 (7) a	4.37 ± 1.07 (9) b	4.80 ± 1.11 (9) b	10.1 ± 10.8 (8) b
CB 38	0.17 (1)	0.31, 0.24 (2)	1.46 (1)	0.78 ± 0.25 (8)
CB 39	0.43 ± 0.10 (7) a	0.43 ± 0.18 (6) a	ND	0.39 ± 0.10 (8) a
CB 77	30.1 ± 10.2 (7) a	17.7 ± 7.79 (9) b	12.3 ± 4.50 (9) b	14.8 ± 3.00 (8) b

Table 9 cont'd.

CB 78	ND	ND	ND	ND
CB 79	0.82 ± 0.10 (7) a	0.89 ± 0.35 (8) a	0.50 ± 0.21 (8) b	0.41 ± 0.17 (8) b
CB 80	70.3 ± 44.0 (7) a	50.4 ± 43.8 (9) a	68.2 ± 33.8 (9) a	48.7 ± 33.2 (8) a
CB 81	7.34 ± 6.19 (7) a	6.50 ± 3.78 (9) a	ND	ND
CB 126	91.8 ± 25.5 (7) a	91.6 ± 51.1 (9) ab	97.5 ± 40.3 (9) a	57.0 ± 20.4 (8) b
CB 127	384 ± 222 (7) a	266 ± 160 (9) a	9.99 ± 5.55 (9) b	5.95 ± 1.11 (8) b
CB 169	8.87 ± 3.43 (7) ab	10.9 ± 3.76 (8) a	10.7 ± 5.43 (9) ab	7.61 ± 1.27 (7) b
Total NO-CB	693 ± 215 (7) a	456 ± 246 (9) a	216 ± 62.7 (9) b	157 ± 55.5 (8) b

Table 10. Mean concentrations and statistical analyses of MO-CB in blubber of ringed seals (*Phoca hispida*) from Holman, NWT, in 1981, 1991 and 1996. Data as pg/g tissue wet wt. (mean ± SD (no of samples in which residues were found)). (Data from Table 5.) Data in the same row followed by the same letter do not differ significantly by *t*-test ($P > 0.05$)

Chlorobiphenyl	1981 (male)	1991 (male)	1996 (male)	1996 (female)
Total Tetra CB	45200 ± 19800 (7) a	26700 ± 9040 (9) b	31800 ± 10100 (9) ab	21300 ± 12700 (9) b
Total Penta CB	83900 ± 33200 (7) a	76300 ± 38800 (9) ab	94700 ± 47600 (9) a	51900 ± 23500 (9) b
Total Hexa CB	6040 ± 2620 (7) ab	5580 ± 2740 (9) ab	7500 ± 4110 (9) a	3750 ± 1850 (9) b
Total Hepta CB	72.3 ± 36.2 (7) ab	81.3 ± 52.2 (9) ab	142 ± 92.3 (9) a	68.9 ± 25.3 (9) b
Total Tetra to Hepta CB	135000 ± 54000 (7) a	109000 ± 49800 (9) ab	134000 ± 59800 (9) a	77000 ± 32200 (9) b

Table 11. Toxic Equivalents (TEQ) calculated for PCDD, PCDF, NO-CB and MO-CB in Holman Ringed seals, 1981 - 1996

Field sample	Year	Sex	PCDD TEQ	PCDF TEQ	NO-CB TEQ	MO-CB TEQ	Total TEQ
PHH 81-28	1981	M	3.85	0.47	9.78	7.55	21.7
PHH 81-29	1981	M	5.49	0.52	9.15	8.58	23.7
PHH 81-8	1981	M	3.15	0.30	4.86	4.52	12.8
PHH 81-6	1981	M	15.9	0.86	13.4	15.5	45.7
PHH 81-7	1981	M	2.82	0.33	NA	NA	3.15
PHH 81-41	1981	M	9.13	0.40	NA	NA	9.53
PHH 81-45	1981	M	4.75	0.47	9.37	11.3	25.9
PHH 81-43	1981	M	5.65	0.38	8.00	16.5	30.5
PHH 81-47	1981	M	5.40	0.44	10.3	14.3	30.5
Mean 1981			6.24	0.46	9.27	11.2	22.6
SD			4.08	0.16	2.57	4.50	12.8
n			9	9	7	7	
PHH 91-1	1991	M	6.15	0.36	9.08	13.3	28.9
PHH 91-3	1991	M	1.13	0.28	5.12	6.59	13.1
PHH 91-21	1991	M	1.69	0.65	10.1	8.03	20.4
PHH 91-23	1991	M	0.60	0.23	4.64	7.53	13.0
PHH 91-24	1991	M	0.81	0.22	5.00	5.61	11.6
PHH 91-28	1991	M	1.18	0.34	8.37	6.85	16.7
PHH 91-13	1991	M	4.74	0.52	13.5	18.8	37.6
PHH 91-14	1991	M	0.61	0.23	6.93	8.55	16.3
PHH 91-15	1991	M	15.4	0.33	20.6	16.9	53.2
Mean 1991			3.59	0.35	9.26	10.2	23.4
SD			4.85	0.15	5.13	4.85	14.0
n			9	9	9	9	9

Table 11 cont'd./2

PHH 96-1	1996	M	7.31	0.28	5.08	5.33	18.0
PHH 96-2	1996	M	2.27	0.40	16.5	11.4	30.6
PHH 96-8	1996	M	10.4	0.38	13.4	24.8	49.0
PHH 96-9	1996	M	2.67	0.47	8.91	9.09	21.1
PHH 96-10	1996	M	1.14	0.27	4.44	6.27	12.1
PHH 96-11	1996	M	2.16	0.58	7.08	7.71	17.5
PHH 96-26	1996	M	2.69	0.46	10.9	20.0	34.0
PHH 96-40	1996	M	2.07	0.38	13.4	15.0	30.8
PHH 96-43	1996	M	1.06	0.33	9.02	17.1	27.6
Mean 1996M			3.53	0.39	9.85	13.0	26.8
SD			3.17	0.10	4.06	6.71	11.1
n			9	9	9	9	9
PHH 96-6	1996	F	1.48	0.48	7.39	7.51	16.9
PHH 96-16	1996	F	0.70	0.23	2.96	2.21	6.1
PHH 96-29	1996	F	2.97	0.45	9.03	13.1	25.5
PHH 96-32	1996	F	0.99	0.36	6.27	6.01	13.6
PHH 96-37	1996	F	0.41	0.35	5.69	8.20	14.6
PHH 96-38	1996	F	0.78	0.21	3.95	6.19	11.1
PHH 96-39	1996	F	1.43	0.33	4.00	5.73	11.5
PHH 96-34	1996	F	1.75	0.49	7.79	5.73	15.8
PHH 96-42	1996	F	2.23	0.32	6.87	7.17	16.6
Mean 1996F			1.42	0.36	5.99	6.87	14.6
SD			0.81	0.10	2.02	2.88	5.30
n			9	9	9	9	9

FIGURE CAPTIONS

Figure 1. PCDD congener distribution in male ringed seals (*Phoca hispida*) from Holman, NWT, in 1981, 1991, and 1996.

Figure 2. PCDF congener distribution in male ringed seals (*Phoca hispida*) from Holman, NWT, in 1981, 1991, and 1996.

Figure 3. Comparison of analyses of six CB analysed in male ringed seals (*Phoca hispida*) from Holman, NWT, in 1981 and 1991 by Axys Laboratories and the Regional Dioxin Lab. (RDL) at IOS.

Figure 4. Trends in MO-CB concentrations in male ringed seals (*Phoca hispida*) from Holman, NWT, in 1981, 1991, and 1996.

Figure 5. Regressions of 1,2,3,6,7,8-HxCDD, OCDD and total PCDD concentrations on age in male ringed seals (*Phoca hispida*) from Holman, NWT in 1981, 1991, and 1996.

Figure 6. Regression of total PCDF concentrations on age in male ringed seals (*Phoca hispida*) from Holman, NWT, in 1981 and 1991.

Figure 7. Regressions of total tetra-, penta-, hexa- and hepta-MO-CB concentrations on age in male ringed seals (*Phoca hispida*) from Holman, NWT, in 1981, 1991, and 1996.

PCDD CONGENER DISTRIBUTION IN HOLMAN MALE RINGED SEALS, 1981-1996

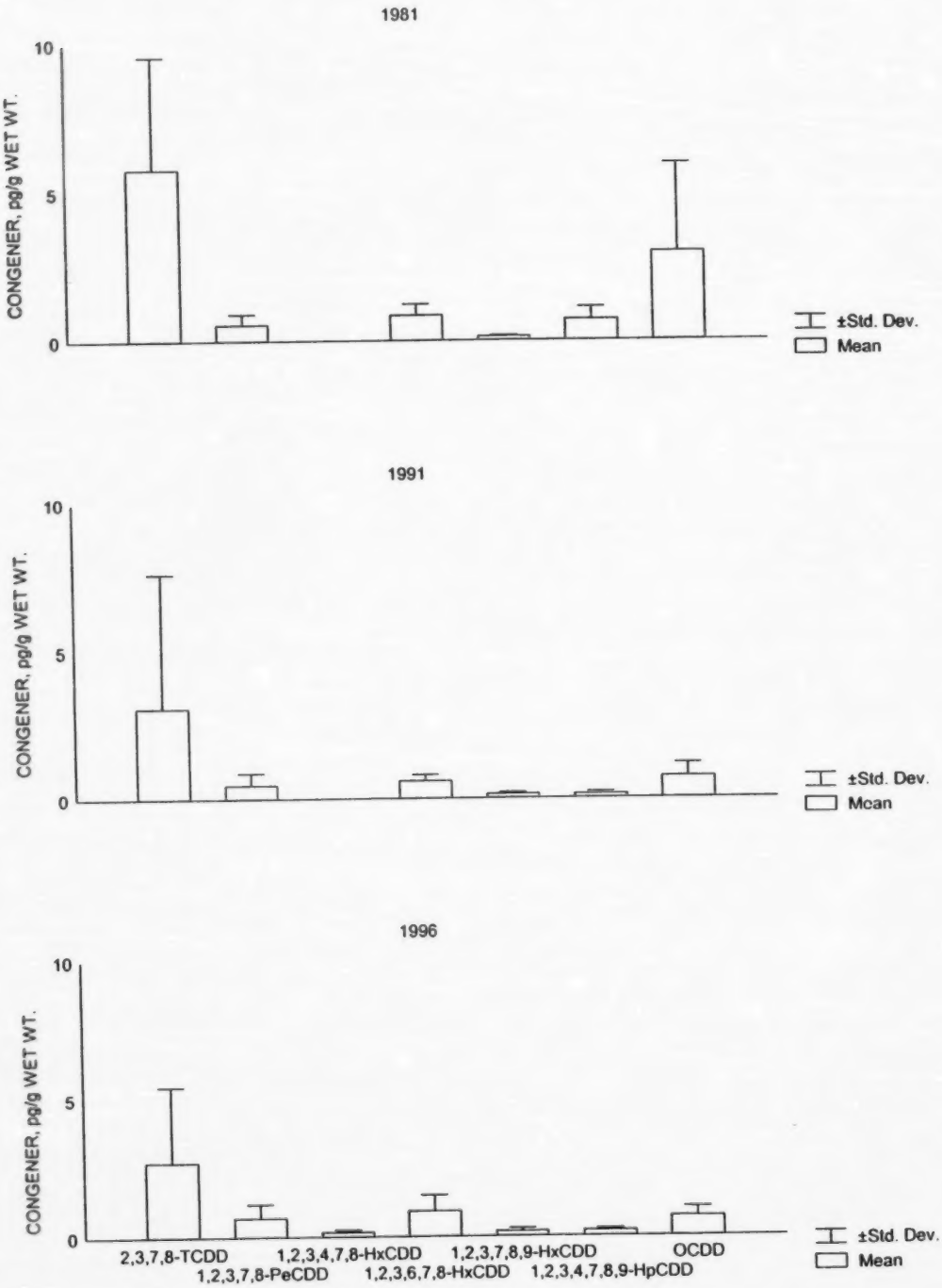

Figure 1. PCDD congener distribution in male ringed seals (*Phoca hispida*) from Holman, NWT, in 1981, 1991, and 1996.

PCDF CONGENER DISTRIBUTION IN HOLMAN MALE RINGED SEALS, 1981-1996

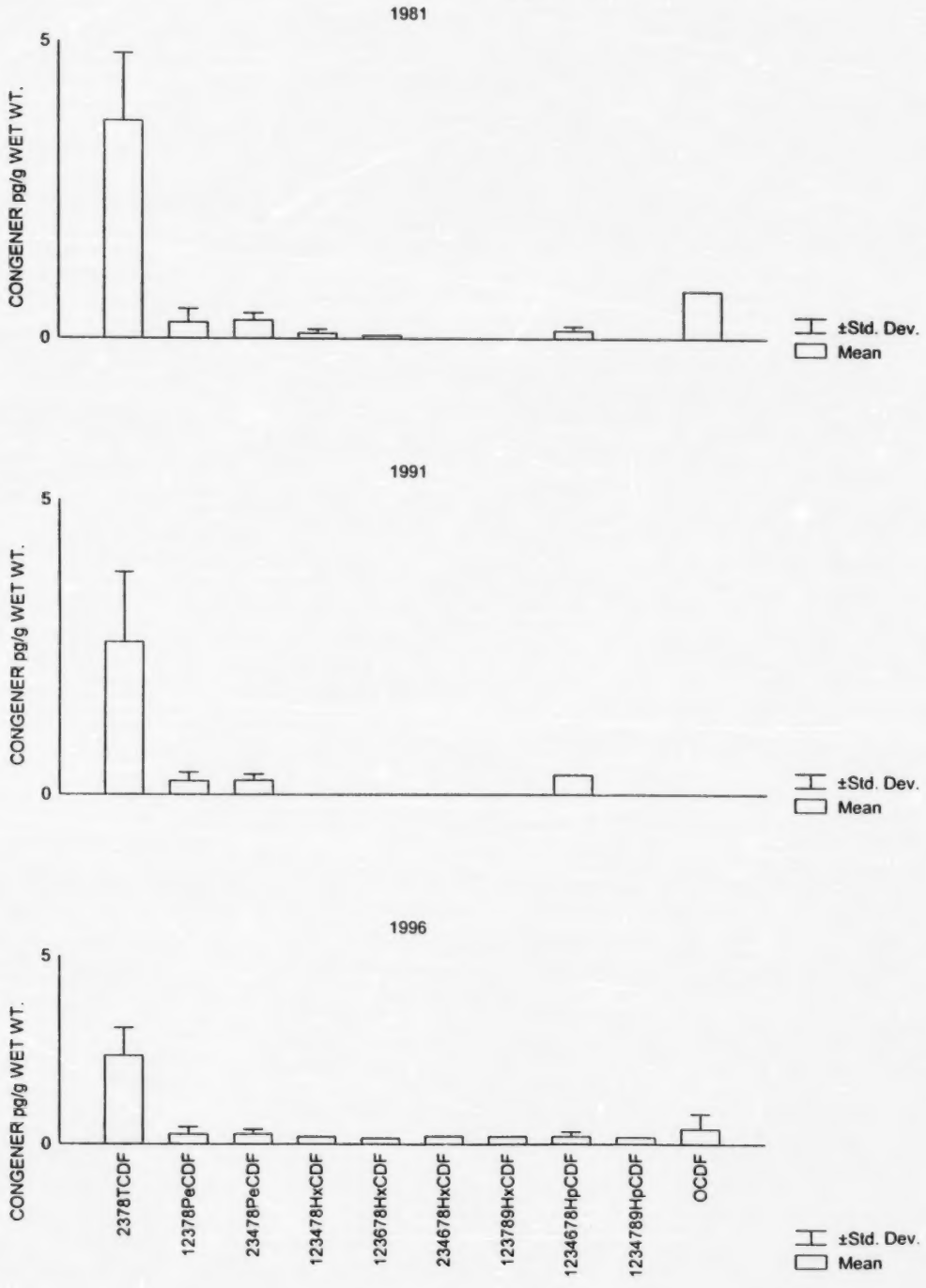

Figure 2. PCDF congener distribution in male ringed seals (*Phoca hispida*) from Holman, NWT, in 1981, 1991, and 1996.

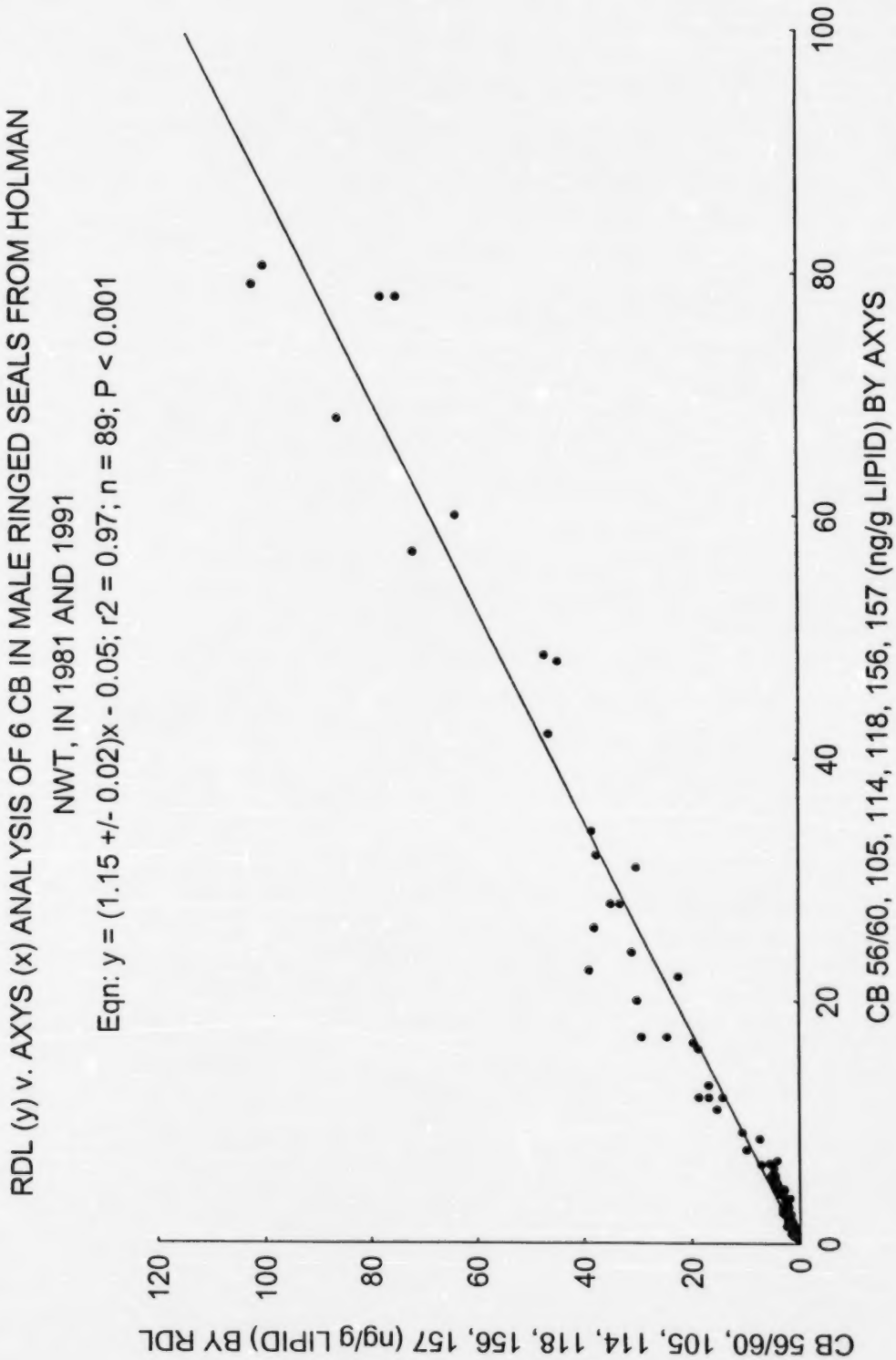
RDL (y) v. AXYS (x) ANALYSIS OF 6 CB IN MALE RINGED SEALS FROM HOLMAN
NWT, IN 1981 AND 1991
Eqn: y = (1.15 +/- 0.02)x - 0.05; r2 = 0.97; n = 89; P < 0.001
CB 56/60, 105, 114, 118, 156, 157 (ng/g LIPID) BY RDL
CB 56/60, 105, 114, 118, 156, 157 (ng/g LIPID) BY AXYS
0
20
40
60
80
100
120

Figure 3. Comparison of analyses of six CB analysed in male ringed seals (*Phoca hispida*) from Holman, NWT, in 1981 and 1991 by Axys Laboratories and the Regional Dioxin Lab. (RDL) at IOS.

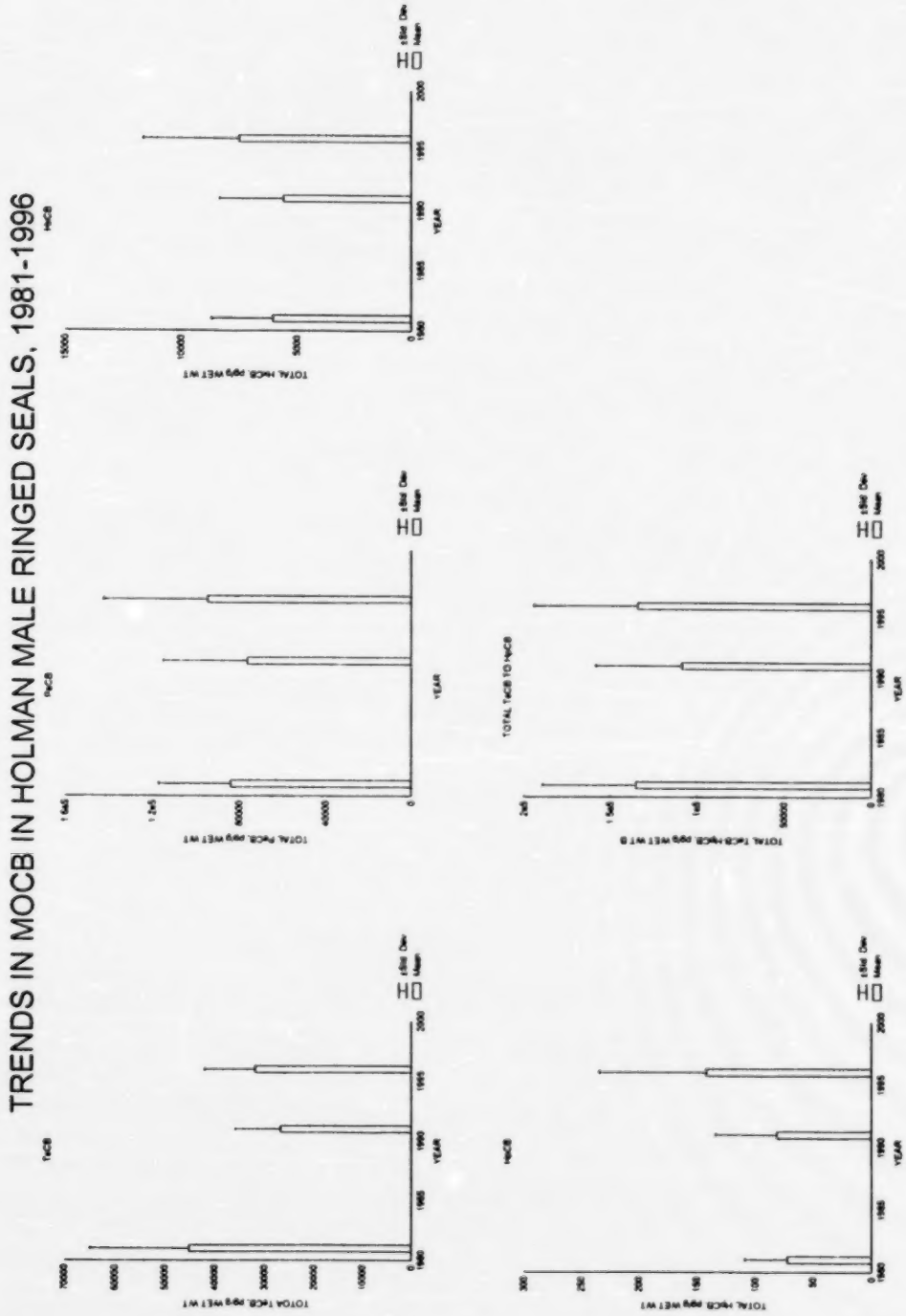

Figure 4. Trends in MO-CB concentrations in male ringed seals (*Phoca hispida*) from Holman, NWT, in 1981, 1991, and 1996.

REGRESSIONS OF CDD ON AGE IN HOLMAN MALE RINGED SEALS, 1981-1996

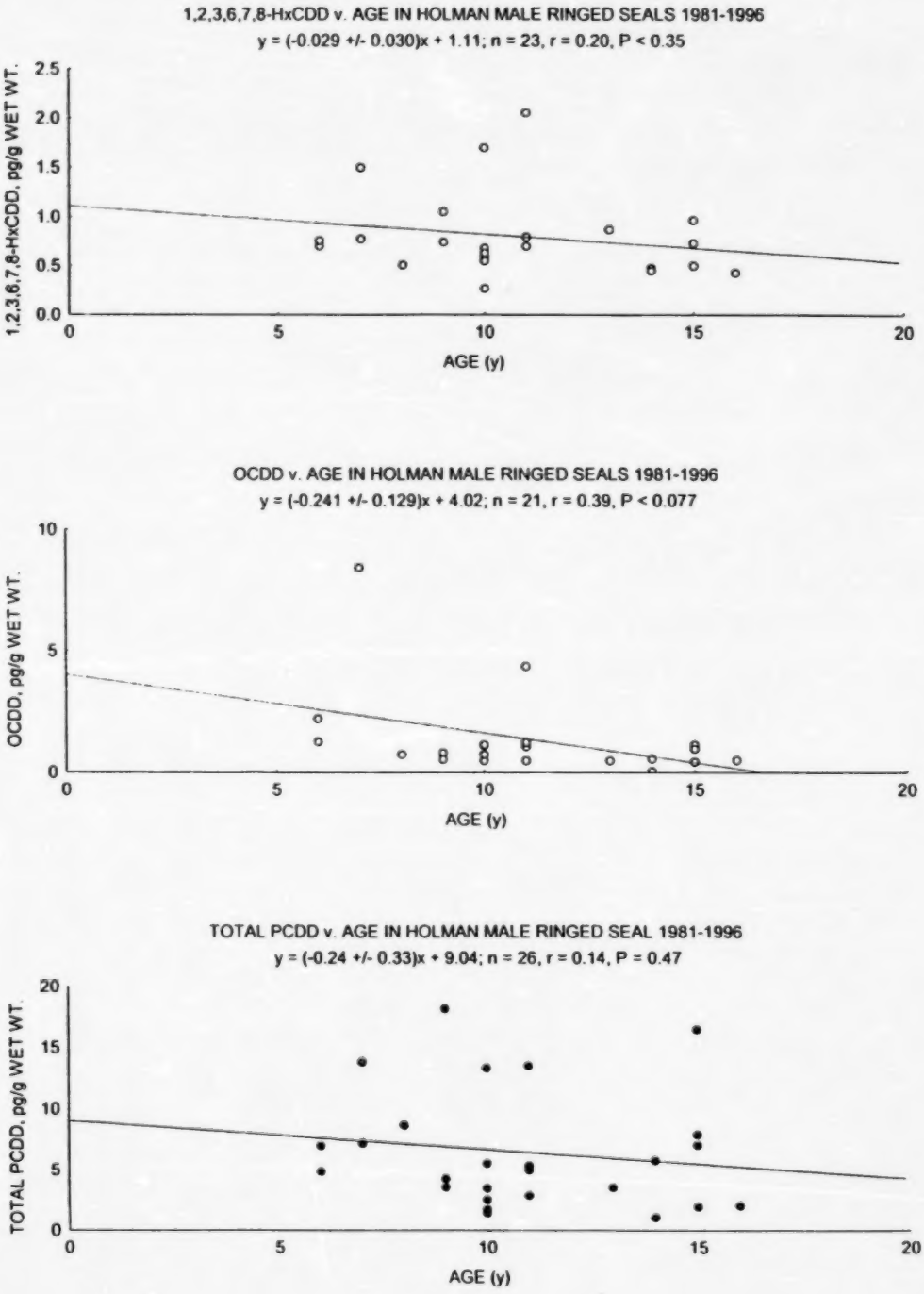
1,2,3,6,7,8-HxCDD v. AGE IN HOLMAN MALE RINGED SEALS 1981-1996
y = (-0.029 +/- 0.030)x + 1.11; n = 23, r = 0.20, P < 0.35
1,2,3,6,7,8-HxCDD, pg/g WET WT.
AGE (y)
OCDD v. AGE IN HOLMAN MALE RINGED SEALS 1981-1996
y = (-0.241 +/- 0.129)x + 4.02; n = 21, r = 0.39, P < 0.077
OCDD, pg/g WET WT.
AGE (y)
TOTAL PCDD v. AGE IN HOLMAN MALE RINGED SEAL 1981-1996
y = (-0.24 +/- 0.33)x + 9.04; n = 26, r = 0.14, P = 0.47
TOTAL PCDD, pg/g WET WT.
AGE (y)

Figure 5. Regressions of 1,2,3,6,7,8-HxCDD, OCDD and total PCDD concentrations on age in male ringed seals (*Phoca hispida*) from Holman, NWT in 1981, 1991, and 1996.

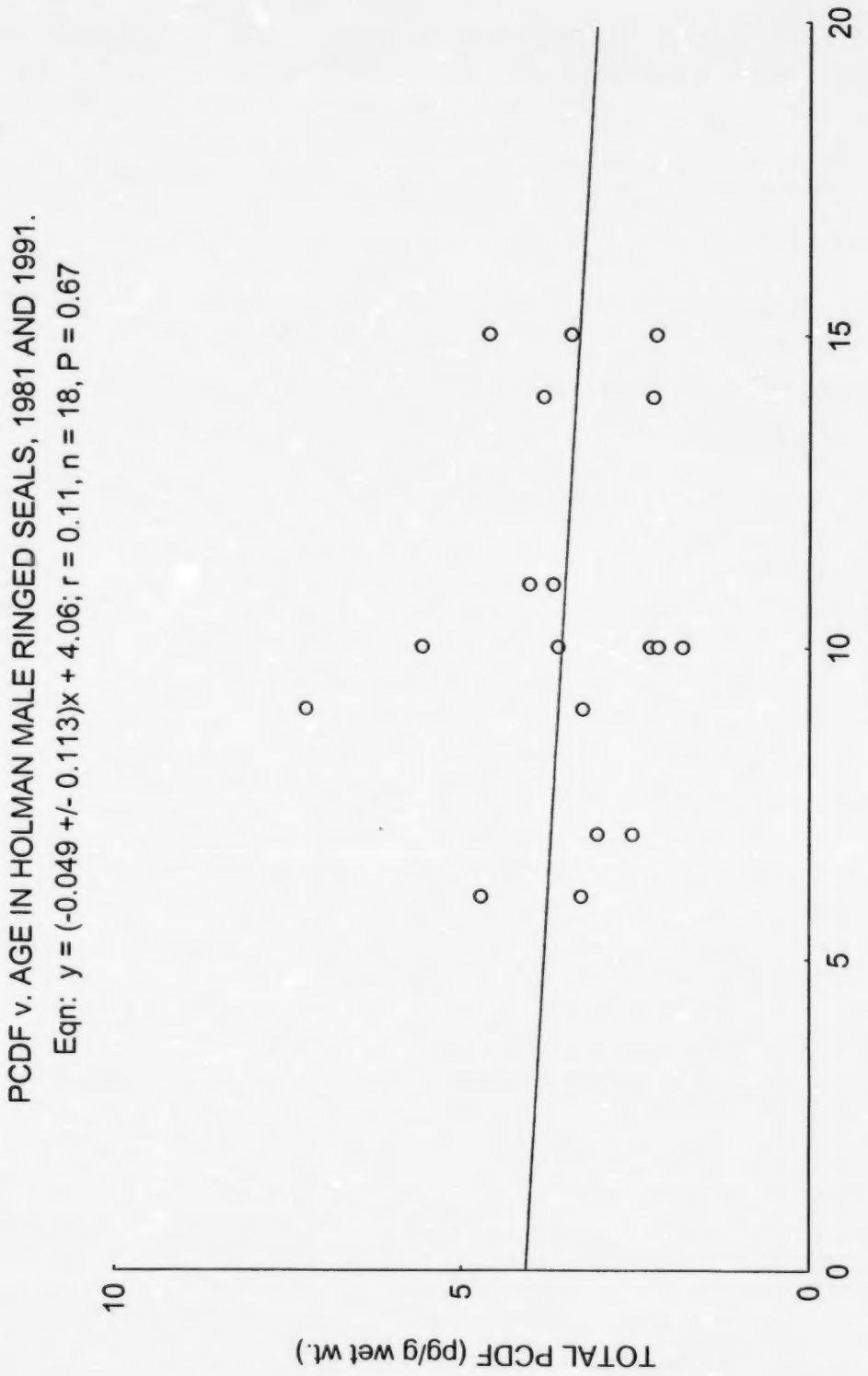

Figure 6. Regression of total PCDF concentrations on age in male ringed seals (*Phoca hispida*) from Holman, NWT, in 1981 and 1991.

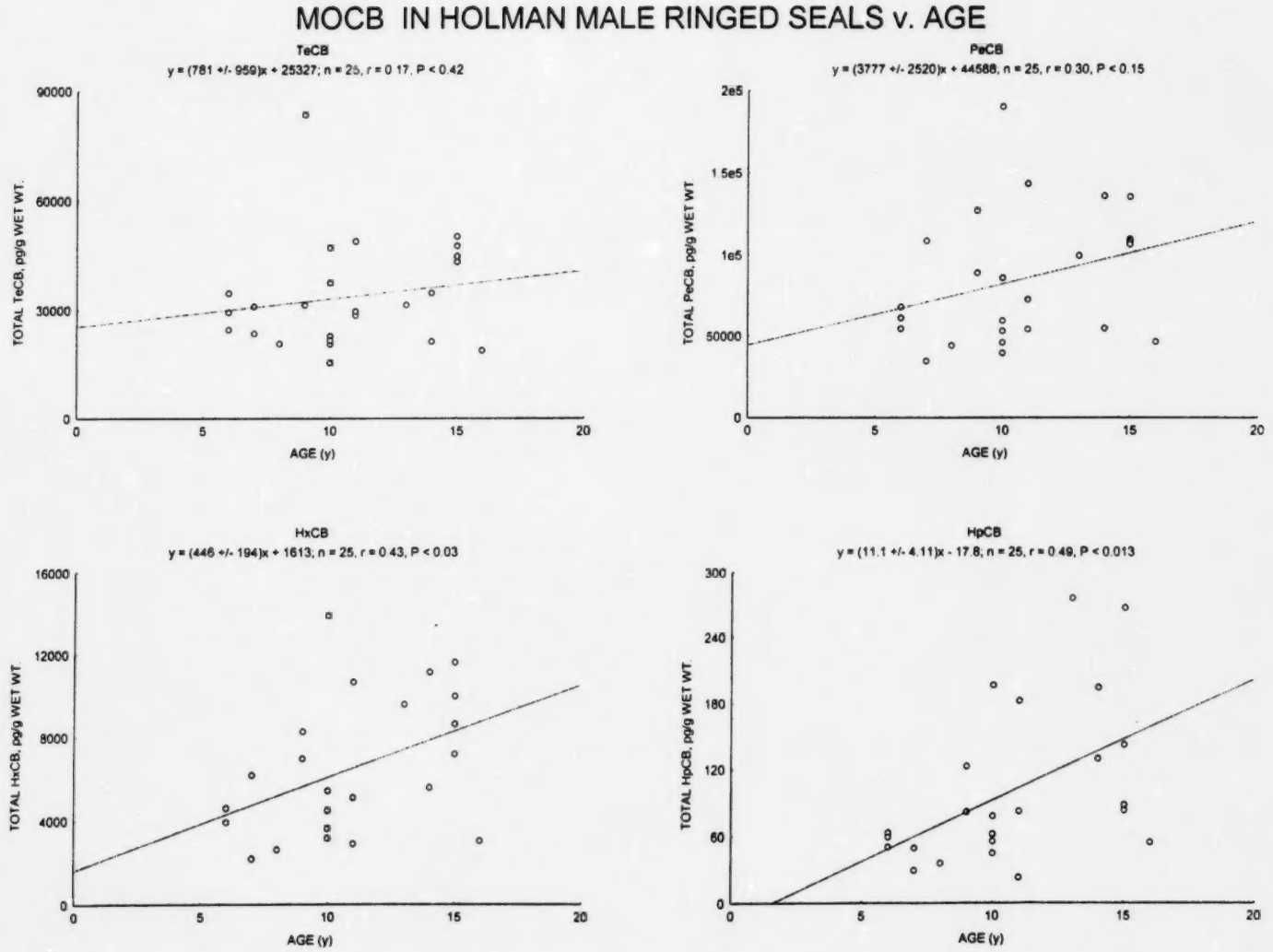
MOCB IN HOLMAN MALE RINGED SEALS v. AGE
TeCB
y = (781 +/- 959)x + 25327; n = 25, r = 0.17, P < 0.42
TOTAL TeCB, pg/g WET WT.
AGE (y)
PeCB
y = (3777 +/- 2520)x + 44586; n = 25, r = 0.30, P < 0.15
TOTAL PeCB, pg/g WET WT
AGE (y)
HxCB
y = (446 +/- 194)x + 1613; n = 25, r = 0.43, P < 0.03
TOTAL HxCB, pg/g WET WT
AGE (y)
HpCB
y = (11.1 +/- 4.11)x - 17.8; n = 25, r = 0.49, P < 0.013
TOTAL HpCB, pg/g WET WT.
AGE (y)

Figure 7. Regressions of total tetra-, penta-, hexa- and hepta-MO-CB concentrations on age in male ringed seals (*Phoca hispida*) from Holman, NWT, in 1981, 1991, and 1996.